

Unit 2

Day 5

Rational Exponents

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

1)

$$4^{1/2} = \sqrt{4} = 2$$

$$2) \quad (24x^6)^{1/3} = \sqrt[3]{24x^6} = 2x^2\sqrt[3]{3}$$

3)

$$-4^{-1/2} = \frac{-1}{4^{1/2}} = \frac{-1}{2}$$

$$a^{\frac{m}{n}} = \sqrt[n]{(a)^m} \text{ or } (\sqrt[n]{a})^m$$

$$4) (-8)^{2/3} = \sqrt[3]{(-8)^2} = \sqrt[3]{64} = 4$$

$$5) (24a^7)^{4/3} = \sqrt[3]{(24a^7)^4} = \sqrt[3]{2^3 \cdot 3 \cdot a^7)^4}$$

$$= \sqrt[3]{2^{12} \cdot 3^4 \cdot a^{28}}$$

$$= 2^4 \cdot 3 \cdot a^9 \sqrt[3]{3a}$$

$$= 48a^9 \sqrt[3]{3a}$$

$$\left( \sqrt[3]{24a^7} \right)^4$$

$$\begin{aligned}
 6) \quad \left(\frac{16}{5}\right)^{-2/3} &= \left(\frac{5}{16}\right)^{2/3} = \left(\frac{\sqrt[3]{5}}{\sqrt[3]{2^4}}\right)^2 = \left(\frac{\sqrt[3]{5}}{2\sqrt[3]{2}}\right)^2 \\
 &= \frac{\sqrt[3]{25}}{4\sqrt[3]{4}} \cdot \frac{\sqrt[3]{2}}{\sqrt[3]{2}} = \frac{\sqrt[3]{50}}{8}
 \end{aligned}$$

## Odds & Ends:

We know that  $\sqrt{\sqrt[3]{5}} = \sqrt[6]{5}$

$(5^{1/3})^{1/2}$

Therefore,  $\sqrt[n]{\sqrt[m]{a}} = \sqrt[mn]{a}$

$(a^{1/m})^{1/n} = a^{1/mn}$

What is  $\sqrt[3]{\sqrt{\sqrt[4]{x}}} = \sqrt[24]{x}$



Write in a simplified radical form

$$\begin{aligned} 4) \quad \sqrt[6]{4} &= \sqrt[6]{2^2} \\ &= 2^{2/6} = 2^{1/3} \\ &= \sqrt[3]{2} \end{aligned}$$

$$\begin{aligned} 5) \quad \sqrt[9]{64} &= \sqrt[9]{2^6} \\ &= \sqrt[3]{2^2} \\ &= \sqrt[3]{4} \end{aligned}$$

6)

$$\begin{aligned}
 & \sqrt[3]{5} \cdot \sqrt{2} = \\
 & 5^{1/3} \cdot 2^{1/2} \\
 & 5^{2/6} \cdot 2^{3/6} \\
 & \sqrt[6]{5^2} \cdot \sqrt[6]{2^3} \\
 & \sqrt[6]{200}
 \end{aligned}$$

7)

$$\begin{aligned}
 & \sqrt[5]{a^2} \cdot \sqrt{b} = \\
 & a^{2/5} \cdot b^{1/2} \\
 & a^{4/10} \cdot b^{5/10} \\
 & \sqrt[10]{a^4} \cdot \sqrt[10]{b^5} \\
 & \sqrt[10]{a^4 b^5}
 \end{aligned}$$

Does  $\sqrt{x^2} = x$  ?

$$x = -5$$

$$\sqrt{(-5)^2} = \sqrt{25} = 5$$

principle  
sqrt  $\sqrt{16} = 4$

$$\sqrt{x^2} = |x|$$

8)

$$\sqrt{(7 - \sqrt{52})^2} = \overset{(-)}{|7 - \sqrt{52}|} = -(7 - \sqrt{52}) = \sqrt{52} - 7$$

$$9) \sqrt{(-2-a^2)^2} = \overset{\ominus}{|-2-a^2|} = 2+a^2$$

$$-2-a^2 = -2+^{-}a^2$$

10)

$$\sqrt{(\sqrt{2}-5)^4} - \sqrt{(2-\sqrt{8})^2}$$

$$|(\sqrt{2}-5)^2| - |2-\sqrt{8}|$$

$$(\sqrt{2}-5)^2 - (-2+\sqrt{8}) \leftarrow$$

$$2 - 10\sqrt{2} + 25 + 2 - \sqrt{8}$$

$$-2\sqrt{2}$$

$$-12\sqrt{2} + 29$$

# HOMEWORK

Unit 2 Day 5 plus Day 6 worksheets